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EXAMINER

TUNG, KEE M

ART UNIT PAPER NUMBER

2671

DATE MAILED: 11/28/2001

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

437,579

Applicant(s)

MacInnis et al

Examiner

K. Tung

Group Art Unit

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—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- ☒ Responsive to communication(s) filed on 10-2-01
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- ☒ Claim(s) 1, 2, 5-59, 61-62 is/are pending in the application.
- Of the above claim(s) _____ is/are withdrawn from consideration.
- ☐ Claim(s) _____ is/are allowed.
- ☒ Claim(s) 1, 2, 5-59, 61, 62 is/are rejected.
- ☐ Claim(s) _____ is/are objected to.
- ☐ Claim(s) _____ are subject to restriction or election requirement.

Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
 - ☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been received.
 - ☐ received in Application No. (Series Code/Serial Number) _____
 - ☐ received in this national stage application from the International Bureau (PCT Rule 1.7.2(a)).

*Certified copies not received: _____

Attachment(s)

- ☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other _____

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DETAILED ACTION

1. The amendment filed 10/2/01 has been considered in preparing this office action.

Claim Rejections - 35 USC § 112

2. Claim 62 recites the limitation "the local memory" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371© of this title before the invention thereof by the applicant for patent.

4. Claims 1, 2, 5, 19 and 62 are rejected under 35 U.S.C. § 102(e) as being anticipated by Ben-Yoseph et al (5,949,439).

Ben-Yoseph et al teaches a graphics accelerator (Fig. 1) comprising a data SRAM memory (SRAM 146) for storing graphics data, the graphics data including pixels; a coprocessor (106) for performing vector operations on a plurality of components of a pixel of the graphics data (col. 3, lines 11-39), wherein the coprocessor processes the plurality of components of the pixels in parallel as

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elements of a vector (col. 3, line 31 through col. 4, line 7, specially, col. 3, lines 50-56). Therefore, at least claims 1 and 2 are anticipated by Ben-Yoseph et al.

As per claim 5, Ben-Yoseph et al teaches the plurality of components of each pixel, comprise R, G and B components of RGB formatted graphics data (inherent by any 3D graphics pixel data which normally in RGB format or YUV format for video data).

As per claim 19, Ben-Yoseph et al teaches the coprocessor has an instruction set that includes a special instruction for comparing between each element of a pair of 3-element vectors (inherent by the VLIW, col. 3, lines 35-39).

As per claim 62, Ben-Yoseph et al teaches a DMA engine for transferring the graphics data between the memory and an external memory (col. 4, lines 36-40 and col. 4, line 65 through col. 5, line 4).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 23, 29-31, 37, 44-46, 50, 51, 58 and 61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ben-Yoseph et al (5,949,439).

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The teachings of Ben-Yoseph et al are given in previous paragraph of this office action. However, Ben-Yoseph et al fails to explicitly teach the DMA engine moves data between the local memory and the external memory while the graphics accelerator is using the memory for its load and store operations. It would have been obvious to one of ordinary skill in the art at the time of the invention to implement the teachings of Ben-Yoseph et al as claimed because Ben-Yoseph et al teaches the multimedia processor 106 operates under control of a **real time multitasking kernel** and **simultaneously** addresses the five semi-independent, quasi-specialized execution units 152; **transmits and receives data simultaneously** over a high speed RAMbus bus DRAM channel I/O bus and other buses, no wait to send and received data between peripherals, the system bus, or the Rambus DRAM 110 (col. 3, lines 40-56 and col. 5, lines 34-40) which clearly shows simultaneous operations as claimed. Therefore, at least claim 23 would have been obvious by Ben-Yoseph et al for the reasons set forth above.

Claim 29 is similar in scope to claim 23, and additionally requires the graphics accelerator is working on operands and producing outputs for one set of pixels, while the DMA engine is bringing in operands for a future set of pixel operations which would have been obvious (by the simultaneous operations of Ben-Yoseph et al) for the same reason set forth above with respect to claim 23.

Claim 30 is similar in scope to claim 23, and additionally requires concurrently transferring blocks of unprocessed data and processed data between the main memory and the local memory while

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the block of graphics data is being processed which would have been obvious (by the simultaneous operations of Ben-Yoseph et al) for the same reason set forth above with respect to claim 23.

The method claim 31 is similar in scope to the apparatus claim 5, and thus is rejected under similar rationale.

As per claim 37, Ben-Yoseph et al teaches each of the plurality of pixels of graphics data comprises YUV components of YUV formatted graphics data (col. 5, lines 5-7).

Claims 44-46 are similar in scope to claim 1 and 19, and thus are rejected under similar rationale.

Claims 50, 51, and 58 are similar in scope to claims 23, 2 and 29, and thus are rejected under similar rationale.

Claim 61 is similar in scope to claim 30, and additionally requires transferring third block of processed graphics data from the on-board memory to the main memory while the first block of graphics data is being processed (obvious by the teachings of Ben-Yoseph et al since Ben-Yoseph et al teaches simultaneously transmits and receives data between peripherals, the system bus or Rambus DRAM, col. 3, lines 40-56).

7. Claims 25-28, 53-57 and 59 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ben-Yoseph et al (5,949,439) in view of Priem et al (6,092,124).

The teachings of Ben-Yoseph et al are given in previous paragraph of this office action. However, Ben-Yoseph et al fails to explicitly teach the DMA engine includes a queue to hold a

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plurality of DMA commands. This is what Priem et al teaches (Fig. 2, DMA 30 and col. 4, lines 35-59; Priem et al further suggests that the DMA engine 30 can be as part of the I/O unit 16 or I/O device col. 4, lines 35-38, such as, graphics accelerator 18, col. 3, lines 51-56). It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of Priem et al into the system of Ben-Yoseph et al in order to facilitate the transfer of data for accomplishing rapid writing as taught by Priem et al (col. 4, lines 35-40). Therefore, at least claim 25 would have been obvious..

As per claim 26, Ben-Yoseph et al teaches the plurality of DMA commands are executed in the order they are received (inherent by any FIFO buffer and/or software queue 144).

As per claim 27, Ben-Yoseph et al teaches the queue comprises a mechanism that allows the graphics accelerator to determine when all the DMA commands have been completed (read and write pointers 136 and 138, col. 5, lines 26-30).

As per claim 28, Priem et al teaches the queue is four deep for storing up to four DMA commands (at least would be obvious by the DMA register, col. 4, lines 39-51).

Claims 53-57 are similar in scope to the claims 25-28, and thus are rejected under similar rationale.

Claim 59 is similar in scope to the combination of claims 25 and 26, and thus is rejected under similar rationale.

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8. Claims 24 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ben-Yoseph et al (5,949,439) in view of Gulick et al (5,758,177).

The teachings of Ben-Yoseph et al are given in previous paragraph of this office action. However, Ben-Yoseph et al fails to explicitly suggest the external memory is a unified memory that is shared by a graphics display system, a CPU and other peripheral devices. This is what Gulick et al teaches (col. 6, lines 39-47 and Fig. 7, 110). Gulick et al further teaches a multimedia processor (Fig. 2) comprising a video/graphics engine (202), general purpose DSP (206), DMA engine (236), memory buffer (234), an audio engine (204) ... It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of Gulick et al into the system of Ben-Yoseph et al in order to provide an unified memory architecture system and thus to fully utilize of the memory capacity and reduce over all system cost without the lost of performance. Therefore, at least claims 24 and 52 would have been obvious by Ben-Yoseph et al and Gulick et al.

9. Claims 6-18, 20-22 32-36, 38-43 and 47-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ben-Yoseph et al (5,949,439) in view of Hancock (5,604,514).

The teachings of Ben-Yoseph et al are given in previous paragraph of this office action. However, Ben-Yoseph et al fails to explicitly mention the pixels are in an RGB16 format. Ben-Yoseph et al teaches receiving video data in an 16-bit YUV format. It was old and well known and well use in the art that the pixel data can be any format, such as, RGB16, RGB8, RGB24, YUV8, YUV16, or YUV24 etc ... Furthermore, Hancock teaches the pixel data can be RGB16, YUV16,

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etc ... (Fig. 3, col. 3, line 52 through col. 4, line 6, col. 5, lines 6-17). It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teachings of Hancock into the system of Ben-Yoseph et al in order to improve video subsystem for concurrently displaying graphics and image data as taught by Hancock (col. 2, lines 28-30). Therefore, at least claims 6-8 and 13-16, would have been obvious by Ben-Yoseph et al, Gulick et al and Hancock.

As per claim 9, Ben-Yoseph et al teaches the two pixels are respectively selected by two special load instructions (col. 3, lines 57-65).

As per claim 10, Ben-Yoseph et al teaches the two special load instructions are for loading a left one and a right one of the two pixels, respectively (150 and col. 3, lines 35-65).

As per claim 11, Ben-Yoseph et al teaches the coprocessor comprises an input register (SRAM 146).

As per claim 12, the combined system fails to specifically suggest the RGB components are expanded into 8-bit components through zero expansion when loaded into the input register. How, it would have been obvious to one of ordinary skill in the at the time the present invention was made to implement the teachings of MPEG decode of Ben-Yoseph et al and Hancock in order to obtain the claimed feature.

As per claims 17 and 18, Ben-Yoseph et al teaches the two pixels are respectively selected by two special load instructions for extracting a first one and a second one of the two pixels, respectively (150 and col. 3, lines 35-65).

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As per claim 20, Ben-Yoseph et al teaches a result register for storing the results of the three comparisons (col. 5, lines 50-62).

As per claim 21, the combined system fails to explicitly teach the results of the three comparisons are used together during a single conditional branch operation. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to implement the teachings of using VLIW technology and instruction unit of Ben-Yoseph et al in order to increase system processing performance.

As per claim 22, the combined system also fails to explicitly teach the special instruction is for a greater-than-or-equal-to operation. It would have been obvious to one of ordinary skill in the art at the time the present invention was made to implement the teachings of Ben-Yoseph et al in order to compare the operands or data.

Claims 32-36, 38-43 and 47-49 are similar in scope to claims 6, 8-10, 14-18, 20, 21, and 22, and thus are rejected under similar rationale.

Response to Arguments

10. Applicant's arguments filed 1/3/01 have been fully considered but they are not persuasive.

The rejections have been modified in order to fully considered applicant's arguments.

Regarding claim 1, applicant argues Ben-Yoseph et al fails to suggest "the coprocessor processes the plurality of components of the pixel in parallel as elements of a vector". The examiner

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disagrees. Ben-Yoseph et al teaches "the 792 bit wide internal data path moves up to 8 billion integers per second between hundreds of **ALUs working in parallel** to achieve 2 billion integer operations per second for most functions .. (col. 3, lines 50-56)". Therefore, applicant's arguments are not persuasive.

Regarding claims 23, 29, 30 and 61, applicant argues that Ben-Yoseph et al fails to teach "DMA engine and the graphics accelerator operate concurrently". The examiner disagrees because Ben-Yoseph et al suggests multitasking and simultaneous operation includes DMA operations for the multimedia processor (col. 3, lines 40-56 and col. 4, lines 34-40).

Responses

11. Responses to this action should be mailed to:

**Commissioner of Patents and Trademarks
Washington, D.C. 20231.**

If applicant desires to fax a response, (703) **308-9051(52)** may be used for formal communications or (703) **308-5403** for informal or draft communications.

Please label "PROPOSED" or "DRAFT" for informal facsimile communications. For after final responses, please label "AFTER FINAL" or "EXPEDITED PROCEDURE" on the document.

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA., Sixth Floor (Receptionist).

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Inquires

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Kee M. Tung** whose telephone number is (703) **305-9660**. The examiner can normally be reached on **Tuesday - Friday from 6:30 am to 5:00 pm**. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Mark Zimmerman**, can be reached on (703) **305-9798**.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) **308-4700**.

November 25, 2001

A handwritten signature in black ink, appearing to read 'K. Tung', is positioned above the printed name and title.

Kee M. Tung
Primary Examiner
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